USING SYSTEM DATA SYNCHRONIZATION

SOLUTIONS GUIDE

SEPTEMBER 2015

Mitel®

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Using System Data Synchronization
Release 8.0
September 2015

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Chapter 1

INTRODUCTION

Introduction and purpose

SDS is a data-sharing technology that allows a network of MiVoice Business controllers to automatically share system and user data, reducing the time to provision and manage changes for multiple MiVoice Business network elements. Data changes are propagated at intervals, ensuring that changes to network data are propagated consistently and accurately across the network, significantly reducing time and management costs, while simplifying network deployment and day-to-day management.

In a network of elements, the System Data Synchronization feature maintains programming data, such as Interconnect Handling Restrictions, Feature Access Codes, and Class of Service Options, identical at each element. Without the System Data Synchronization (SDS) feature, you would have to manually program the data to be the same. Then, you would have to make all future modifications of system data on each element to keep the element databases synchronized.

The SDS feature reduces the time required to set up and manage elements in an SDS sharing network by allowing you to:

- Share data among elements in a network, cluster, and admin group, and resilient pairs, as it changes.
- Synchronize the form data from a master element with the forms on the other elements in the network, cluster or administrative group at a single point in time, by clicking the **Sync** button.

Note: This guide uses MiVoice Business Release 7.2 System Administration Tool form names, but the SDS concepts, terminology, and operation applies to all MCD/MiVoice Business releases from MCD Release 4.0 up.

Note: This guide includes new features introduced in MiVoice Business Releases 7.2, and MiCollab Release 7.0.

Topology of solution

SDS works in any topology of Mitel MiVoice Business controllers, regardless of location, and can also encompass a MiCollab server under specific conditions.

Note that, in the following figures, the controllers could be any combination of:

- 3300 ICP controllers
- MiVoice Business controller running on industry standard servers (ISS)
- MiVoice Business Multi-instance - multiple MiVoice Business instances running on ISS
- MiVoice Business Virtual

The following servers can also be added as network elements for the purposes of sharing data:

- Enterprise Manager
- MiCollab server
- Mitel Open Integration Gateway (OIG) server (from Mitel OIG 2.1 and newer, the OIG must be set up for SDS sharing with the MiVoice Business controllers.)

In Figure 1, the network is divided into two clusters. In this example, the Telephone Directory is shared across the entire network, while Class of Service data is shared at the cluster level. In this example, all the nodes are Mitel 3300 ICPs, but they could be MiVoice Business controllers or virtual MiVoice Business Virtual instances running on any supported platform, as mentioned above.

Other network elements (SX-2000 or MiVoice Office, for example) can exist in the network, but they are not capable of sharing data using SDS.

Figure 1: Scope of Data Sharing at Network and Cluster

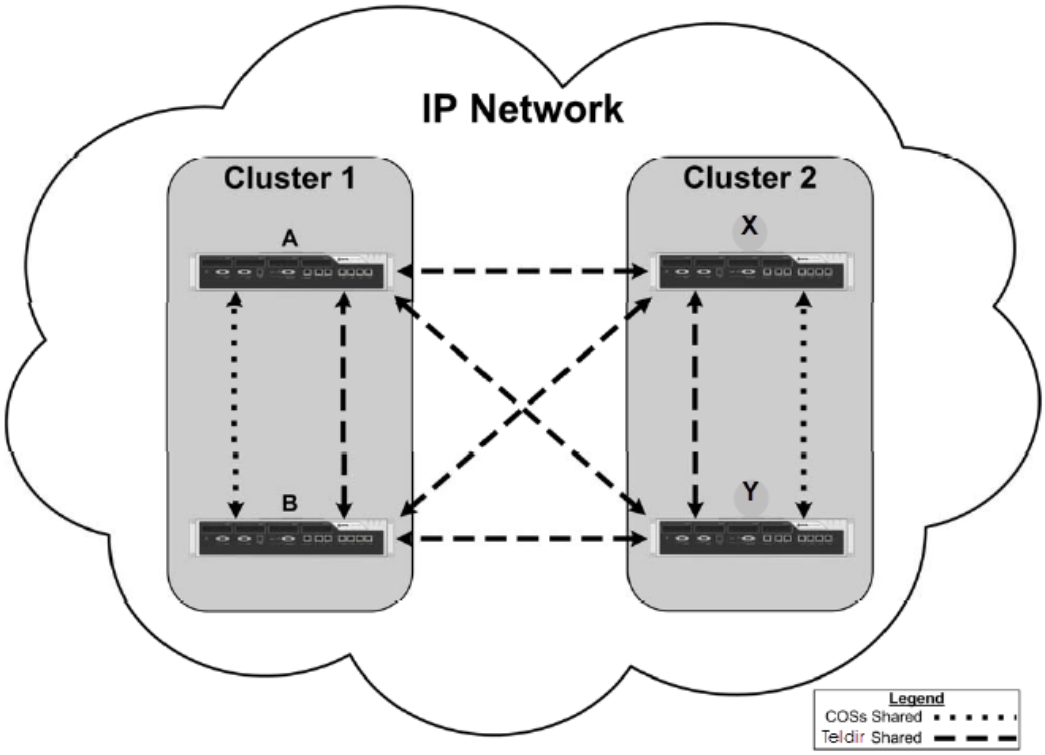
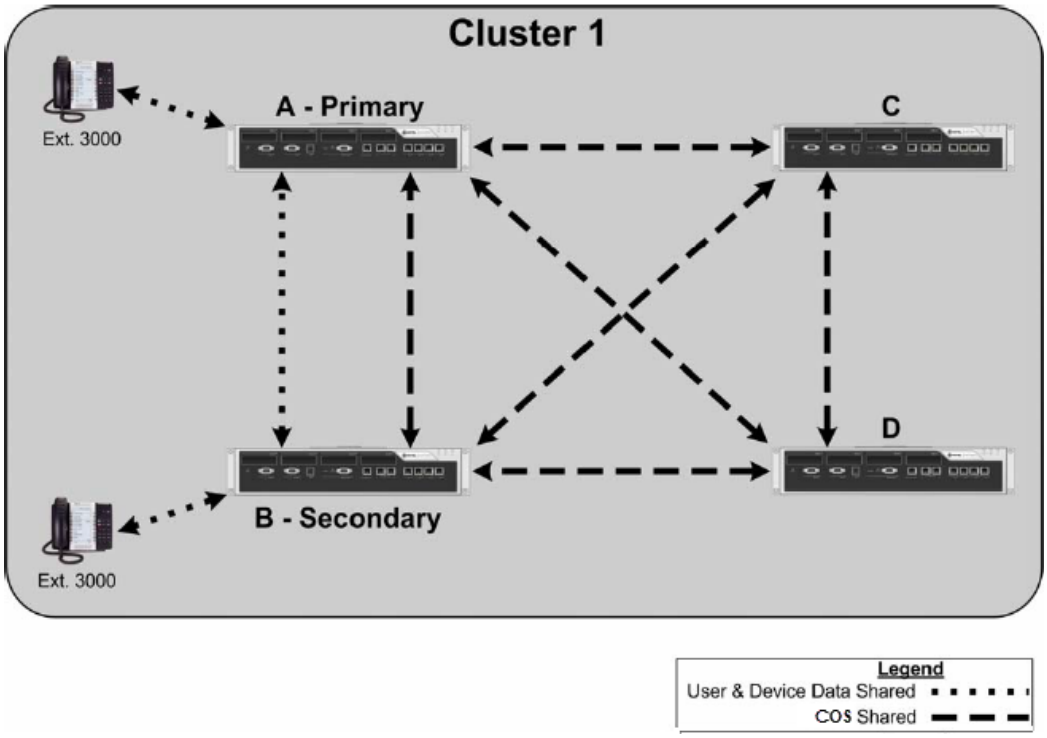


Figure 2 shows phone devices connected to two controllers. For the device at the top of the figure, Network Element A is the primary controller and Network Element B is the secondary controller. For the device at the bottom of the figure, the primary and secondary controllers are reversed.

In this example, while much of the data will be shared across the entire network (the network scope), device changes are shared only at the resilient pair scope; between Network Element A and Network Element B.

Figure 2: Scope of data Sharing at Resilient Pair



Terms and Acronyms

The following table defines some of the terms used in this guide.

Table 1: Terms and Acronyms

TERM	DEFINITION
3300 ICP	The 3300 ICP is the Mitel hardware platform on which the MiVoice Business (formerly called MCD) controller software is run. The 3300 ICP is a dedicated hardware platform providing computational services for the MiVoice Business software, as well as dedicated hardware for media services and gateway connectivity; PSTN trunks, for example.
CESID	Customer Emergency Services ID
Cluster	In cluster groupings, all users can dial all other users in the cluster directly with the extension number. Calls between clusters, within the network, require additional dialling plans. You must organize your network elements in clusters if you are configuring resiliency.
Form data	All networking configuration and programming is done through forms in the System Administration Tool. The data in the forms is called Form data.
ISS	Industry Standard Server
MCD	Mitel Communications Director (now called MiVoice Business) MiVoice Business is the Call Control software. It can run on dedicated 3300 ICP hardware as an appliance, or on industry standard servers directly, or in virtual form with MiVoice Business Virtual.
MiCollab	Mitel MiCollab combines collaboration, mobility, and messaging into a single solution that empowers people to collaborate more easily and effectively, no matter where they are, how they work and what device they use.
MiVoice Business	MiVoice Business is the Mitel call control software. It can run on dedicated 3300 ICP hardware as an appliance, or on industry standard servers directly, or in virtual form with MiVoice Business Virtual.
MiVoice Office	Formerly Mitel 5000 CP.
RDN	Remote Directory Number
Resilient Pairs	Devices (IP phones and IP consoles) can be configured to have a primary controller and a secondary controller, with the secondary controller available to immediately take over if the primary controller fails. The primary and secondary controllers can be referred to as a resilient pair. SDS allows you to keep these two controllers synchronized so that the devices can be moved seamlessly from primary to secondary in the event of a controller failure.
SDS	System Data Synchronization - The system of sharing data among controllers in a network. Depending on configuration, changes made to form data on any controller in the network can be automatically propagated to all other controllers in the network, and the controllers synchronized.
Sharing Scope	The data shared among network elements using SDS can be shared across the whole network, within the cluster or administrative group, or by resilient pairs. These are some of the choices for the sharing scope.

Table 1: Terms and Acronyms

TERM	DEFINITION
Sync synchronization	In a network, SDS allows you to make the network elements form data the same on each network element. When the form data matches across elements in the network, they are said to be in synchronization. To synchronize the network, you click the Sync button on the Network Elements form.
USP	MiCollab User and Services Provisioning
vMCD	virtual MCD - now called MiVoice Business Virtual MiVoice Business software running on a VMware virtual machine on an industry standard server.

Chapter 2

USING SYSTEM DATA SYNCHRONIZATION

Overview

With SDS, all additions, modifications, and deletions to shared data are automatically distributed to the other elements in the network at the specified sharing scopes.

In resilient configurations, SDS synchronizes the data of resilient users and devices between primary and secondary controllers in a cluster.

This chapter explains the following topics:

Note: All nodes in the network must be running MCD Release 4.1+, MiVoice Release 7.0+, or MCD Release 4.0 migrated to RDN Synchronization Mode. For information about applying this migration, refer to the *Migrating to RDN Synchronization Mode Solutions Guide*.

Terms and concepts

The following sections define the special terms used in describing SDS.

Form data

Controllers in the network are programmed using specifically-designed forms in the System Administration Tool. Forms are organized by function. You can also search an alphabetical list of all the forms to find the form you want to view and change.

There are forms for every type of data, including, for example, Feature Access Codes (FAC), Class of Service (COS), and Class of Restriction (COR). All users and devices are set up using forms, as are Automatic Call Distribution and Automatic Route Selection rules. All of the changes and actions you perform on each MiVoice Business network element in your network is done through these forms. You also use the forms to view the system logs and use the maintenance commands. Note that the systems logs forms are not shared.

When setting up a network for SDS sharing, you use the **Network Elements** form, which has an entry for each element in the network. This is where you add elements to your network, and this is the form to use to start SDS sharing and to Sync the data in the network.

SDS sharing

SDS sharing happens in two ways:

- Every time a change is made to any of the nodes in the sharing group, the change is propagated to all of the other network elements, automatically, at the record level, and at the defined sharing scope.
- When you click the **Sync** button on the **Network Elements** form, data in the selected forms is sent from the current master element, in bulk, to the selected elements that are selected and configured for SDS sharing.

Change propagation

There is some data that you need to share with every node in the network, while other data needs to be shared only within the Cluster. Some data will be shared only between the primary and secondary controllers in a resilient pair. There is also some data—physical trunking information, for example—that should not be shared at all because it is specific to one controller.

The sharing scope for each form is pre-set, and the default sharing scopes work well for most applications. You can edit them, if required, but you probably will not need to.

SDS sharing occurs whenever a change is made on a network element, (if the change is on a form that is shared). This happens automatically every time a change is made. SDS sharing affects only the database records that were changed. If one COS record is changed on a network element, this record is shared with the rest of the network elements, without updating any of the unchanged records on the form.

Note: Forms that are shared are identified with this icon: 

With a MiCollab server in the network (Flow Through Provisioning)

You can add one MiCollab server as a Network Element in a MiVoice Business network. This configuration is subject to the following conditions and limitations. Outside of these conditions, synchronization must be managed manually.

- Only one MiCollab is allowed per SDS sharing network.
- All MiVoice Business controllers are in one Admin Group, and there is only one MiVoice Business cluster in the network.
- MiCollab is at Release 7.0+ and ***all*** MiVoice Business nodes are at 7.1 SP1+
- Flow Through Provisioning must be enabled (started) either from the Mitel Integrated Configuration wizard or manually from a MiVoice Business platform in the administration group of the cluster.
- If resiliency is configured for a MiVoice Business solution, data updates are sent from MiCollab to the primary controller. If the primary controller is out of service, the MiCollab USP application does not provide data updates to the secondary controller. Instead, an error message is presented in MiCollab indicating that the primary controller cannot be reached.
- Although you can view analog and DNIC phones from MiCollab User and Services Provisioning (USP), you cannot create them.
- A maximum of three phones are supported in a shared MiCollab template. You cannot use a template that is programmed with more than three phones.
- The synchronization of MiVoice Business elements with MiCollab takes substantially longer than the synchronization of just MiVoice Business element form data.

For detailed configuration, conditions, and limitations, refer to the Flow Through Provisioning topics in the MiCollab Server Manager Help.

SDS Sync operation

To synchronize all of the data at once, use the **Sync** button on the **Network Elements** form. After clicking **Sync**, you must choose which forms to synchronize. You can select all forms, or specific forms. The data in the forms is sent to all of the other network elements in the sharing scope. The network element you are logged in to when you initiate the Sync operation is the master (Sync master), and the data from the master generally takes precedence over any of the data on any of the other elements (slaves) in the sharing scope.

You must initiate a **Sync** operation at the following times:

- After setting up SDS sharing with other network elements using the **Start Sharing** button (on the **Network Elements** form). You initiate a Sync operation from the Sync master to synchronize the data on the slave node.
- After doing a restore on a network element. Log into an up-to-date network element in the sharing network, and initiate a **Sync** with the network element you restored.

Note: It is strongly recommended that you do frequent backups so that the restore files are up-to-date.

Synchronization master vs. change master

With SDS, changes are propagated from the network element on which the change has taken place, or the element from which you click **Sync**. Depending on your actions, we may refer to a network element as a “change master” or a “Sync master”.

- Change master

  When you make changes on a network element, this element becomes the change master, and the changes are propagated automatically to all of the other network elements set up for sharing with this element. The new information on the change master is written to each of the slave elements, and the original data on the slave elements is overwritten.

  If you make a change on Element A, for example, the change is propagated to all the other elements set up for sharing with Element A. In this example, Element A is the change master for this particular change.

  If you finish the change on Element A, and then log in to make changes on Element B, any changes you make on Element B are propagated to the other elements in the sharing scope, and Element B becomes the change master. Sharing scope is explained in “Sharing scope” on page 15.

- Sync master

  The Sync master is the network element from which you click **Sync** to synchronize the elements of the network. The **Sync** button is available on the **Network Elements** form.

  The Sync slave is any network element you select before clicking **Sync**. Database records on the Sync slave are overwritten or merged with the data on the Sync master, depending on the type of the data and the Sync settings. For more information about “overwrite” and “merge” operations, see “Overwrite vs. Merge in the Sync operation” on page 41.

  For certain shared forms, you can select one or more records that are not to be shared (or Sync’d). This is done using the option called **All records except those specified below** in the **SDS Form Sharing** form.

Note: Do not use a Mitel 3300 ICP AX Controller as a Sync master; the AX controller does not have enough storage space to accommodate a large number of SDS Distribution Errors and pending updates.
This could result in multiple Sync operations being required to complete the synchronization.

Sharing scope

System data can be shared form by form at a sharing scope you set in the **SDS Form Sharing** form (or you can use the default sharing scopes). The sharing scope can be set to share form data within an administrative group, across the entire network, or across resilient pairs, for example.

The following sections list the available sharing scopes, and describe the data distribution of updates for the named sharing scope.

- All Network Elements

  Distribute updates to all network elements that re sharing through SDS.

- All Cluster Members

  Distribute updates to all cluster elements.

- Network Group Members

  Reserved configuration for future use.

- All MiVoice Business/3300 ICP

  Distribute updates only to the MiVoice Business elements in the network. This includes all MiVoice Business and MiVoice Business Multi-instance elements, including 3300 ICP appliances.

- Admin Group Members

  Distribute updates to all elements that belong to the administrative group. Use administrative groups to share data among groups of elements within the network.

- Resilient Pair

  Distribute resilient user and device data between a primary and secondary controller.

- Member Hosts

  Distribute group information and group member data between all the elements on which the group members reside.This sharing scope applies to pick-up groups but does not apply to network hunt groups or resilient ACD hunt groups.

  This sharing scope is predefined, according to the type of group, and it is read-only; you cannot change it.

- Host and Gateway

  Distribute updates to the Guest Room DNs primary node, and the hospitality gateway node.

- None

  No form data is distributed.

SDS Distribution errors and Pending updates

The **SDS Distribution Errors** form displays any synchronization delays and errors that occur when changes are propagated to other network elements in your sharing network. This form

shows the status of pending updates and updates that were not distributed successfully to other network elements.

Note: It is important to check this form after making data changes, particularly in networks that are out of synchronization.

Distribution errors occur for one of a number of reasons, including:

- application error: An application error occurs when the receiving database cannot validate the data.
- concurrent change rejection, or conflict error: Each update is sent along with the parameter's previous value, and SDS tries to match the original value before writing the update. If the original values do not match, the update is not written.
- connection error: The update times out. This could be because the receiving network element is down, or because of a problem with the connection. SDS automatically retries these updates periodically, so if the connection problem is resolved, the connection errors will be cleared automatically.

SDS Distribution Errors must be resolved to keep your network elements synchronized.

CAUTION: DO NOT DELETE SDS distribution errors unless they represent an update that is understood, and not needed.

Pending updates

Pending updates are updates that have not yet been written. If you see pending updates in the **SDS Distribution Errors** form, it is usually because the receiving node is busy or there are so many changes that they cannot all be processed in the current cycle. Generally, pending updates are completed in the allotted time. Unless there is an error, pending updates will be retried at predetermined intervals.

What forms can be shared?

Many forms in the System Administration Tool can be shared with other elements in the network, but some forms are not shared, by default. For example, form data for the physical trunks should not generally be shared, since the form data applies only to the physical attributes at one 3300 ICP. The following forms are not shared by default (this is not the full list):

- Trunk Circuit Descriptor - CO
- Trunk Circuit Descriptor - DID
- Trunk Circuit Descriptor - Digital CO
- Trunk Circuit Descriptor - Digital DID
- Trunk Circuit Descriptor - Digital E and M
- DTS Service Profiles
- Trunk Circuit Descriptor - Loop Tie
- Trunk Circuit Descriptor - MSDN-DPNSS-DASSII

- ARS Digits Dialed
- ARS Leading Digits

Every shared form in the system has a default sharing scope. See “Sharing scope” on page 15 for more information about the sharing scope.

For most forms, you can change the sharing scope, but plan your network carefully before making changes. Because sharing form data may overwrite data on other network elements, sharing data inappropriately could result in loss of data, or even loss of service.

For details and conditions, refer to:

- MiVoice Business System Administration Tool Online Help
- MiCollab Server Manager Help

Comparing form data before performing Sync

Because full system data synchronizations can take a significant amount of time, you should not perform unnecessary Sync operations. The **SDS Form Comparison** form allows you to compare the data from a shareable form on the local element against the form data on a remote element to determine whether they are in sync.

Note: It is recommended that you perform Sync operations during periods of lower call activity.

You should also use **SDS Form Comparison** to determine whether you should or should not synchronize specific data. There may be data that must be kept specific to each node. In the case where data sharing is not appropriate, or would cause reprogramming work you are not currently prepared to do, you can set the forms not to share during SDS automatic updates by disabling synchronization for that form.

SDS in Mitel networks of different configurations

Using SDS in a large enterprise network is similar to running SDS between two nodes, except that, in the multi-site case, the data may be sent over a WAN or via satellite link to some of the nodes.

For an installation of just one node, SDS is not relevant, because the one node does not need to be synchronized with anything—unless you also have one or more nodes in other locations on the same network.

Resilient networks use SDS in the same way as non-resilient networks do, except that there is an additional level of synchronization between primary and secondary controllers for groups of devices. For more information, see “SDS and resilient devices” on page 30.

When to perform a Sync

Perform a Sync in all of these cases, using the most up-to-date node as the Sync master:

- A software upgrade of MiVoice Business or MiCollab elements to a new version:
  - after upgrading all nodes
  - after upgrading both nodes in a resilient pair
- A backup is restored to a node in the network, and the node needs to be updated with recent changes.
- A network link went down, or a node crashed, and the problem has been resolved.
- A new network element is added.

Small single-site network

SDS sharing among networks in a small single-site network is straight-forward when following the guidelines in this book. There are no particular challenges, especially since you can physically work on every network element in your network to fix problem data directly on the MiVoice Business controller.

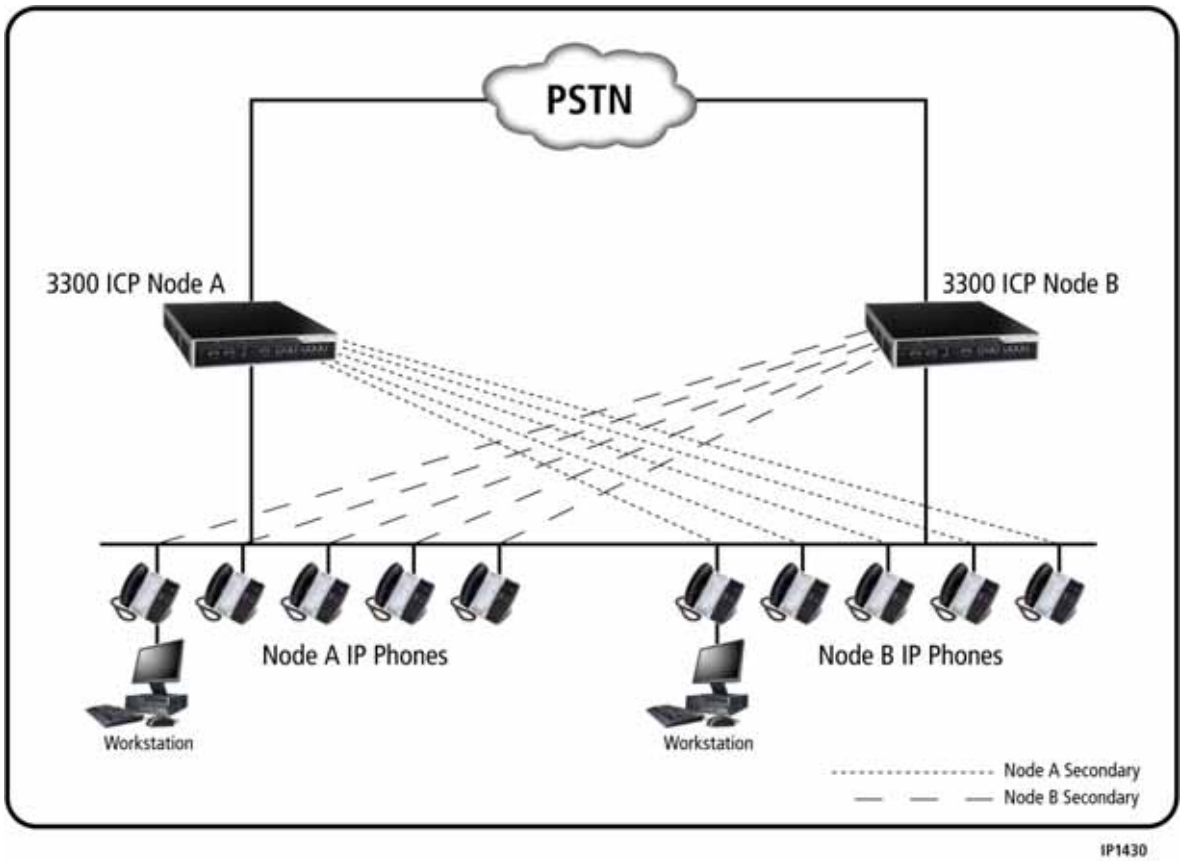
To add a MiCollab server in the sharing network, select it on the Network Elements form in the same way that you add MiVoice Business nodes. When adding a MiCollab server, you must also run the MiCollab Reconcile tool once at first sharing. For details and instructions, refer to the MiCollab Server Manager Help, in the Flow Through Provisioning topics.

You can also use Reach Through from the MiCollab server, and you can view and change form data on any of the connected MiVoice Business nodes.

Note: Reach Through is supported only using Internet Explorer (version 7.0 or later) or Mozilla Firefox (version 17 or later) browsers and you must have installed the browser with the Mitel Root Certificate. If you attempt to use any other type of browser to reach through from MiCollab to MiVoice Business, reach through will be blocked. Note that Internet Explorer is not supported in Compatibility Mode.

Note: To use Reach Through, you must enable SNMP agents on every element in the Admin Group.

Figure 3: Single site network - resilient



Distributed network

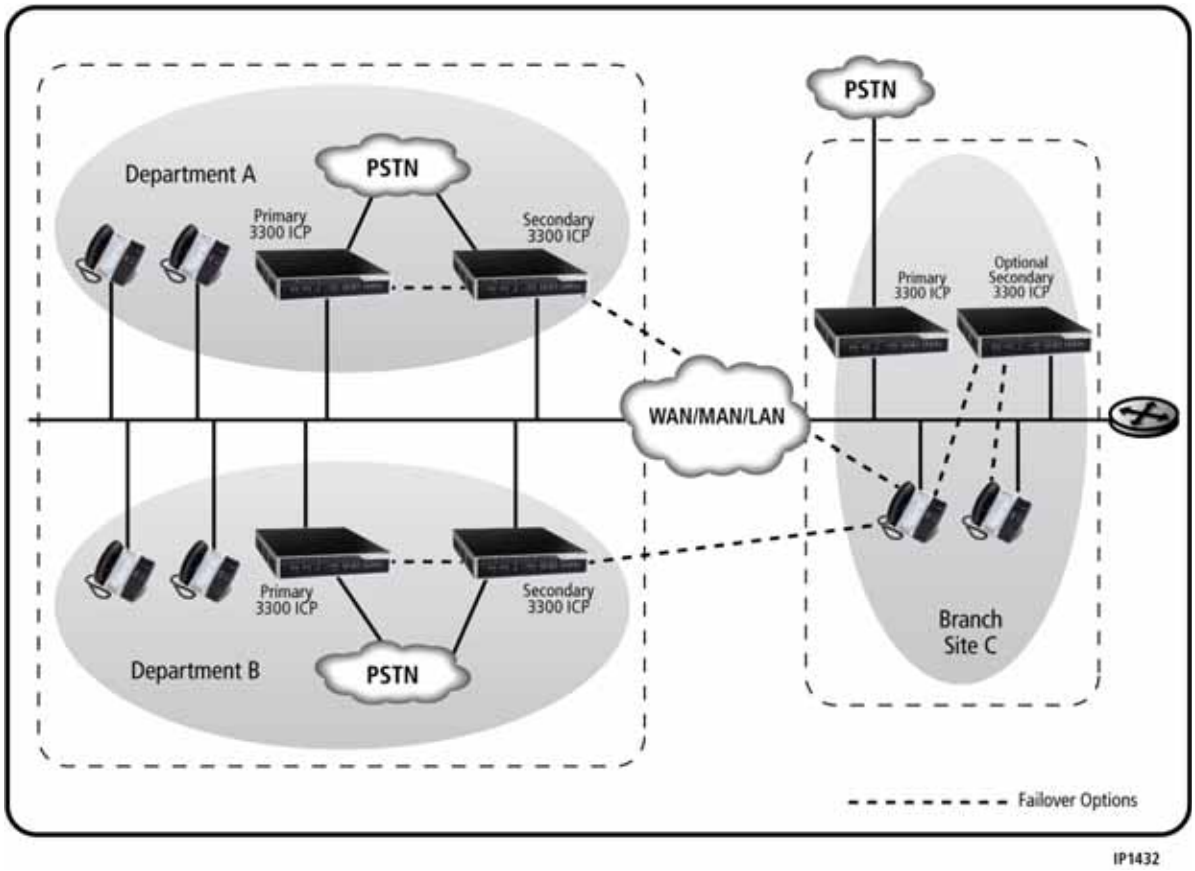
A distributed network can comprise any number of nodes—from one to hundreds of network elements—and can be configured for resiliency, or not.

You may not want to perform a Sync with all nodes at once. You could Sync with the local nodes first, and resolve any errors before starting a Sync operation with the remote sites. If you have many network elements at each site, you might perform the Sync with just a few network elements at a time until you have performed an error-free synchronization with all of the elements in the network.

Note: If you are running a mixed-release network, you may always have SDS errors on certain nodes, since different MCD/MiVoice Business releases may have database schema differences that result in some data not being accepted on some nodes.

In MCD Release 6.0, the CESID length was changed from 10 digits to 12 digits. If an 11 or 12 digit CESID is shared (by SDS) with a node that supports only 10 digit CESIDs, SDS Distribution errors are generated on the change master. CESID is shared at resilient scope (between pairs of resilient nodes). Primary and secondary nodes should always be running the same version of MCD/MiVoice Business.

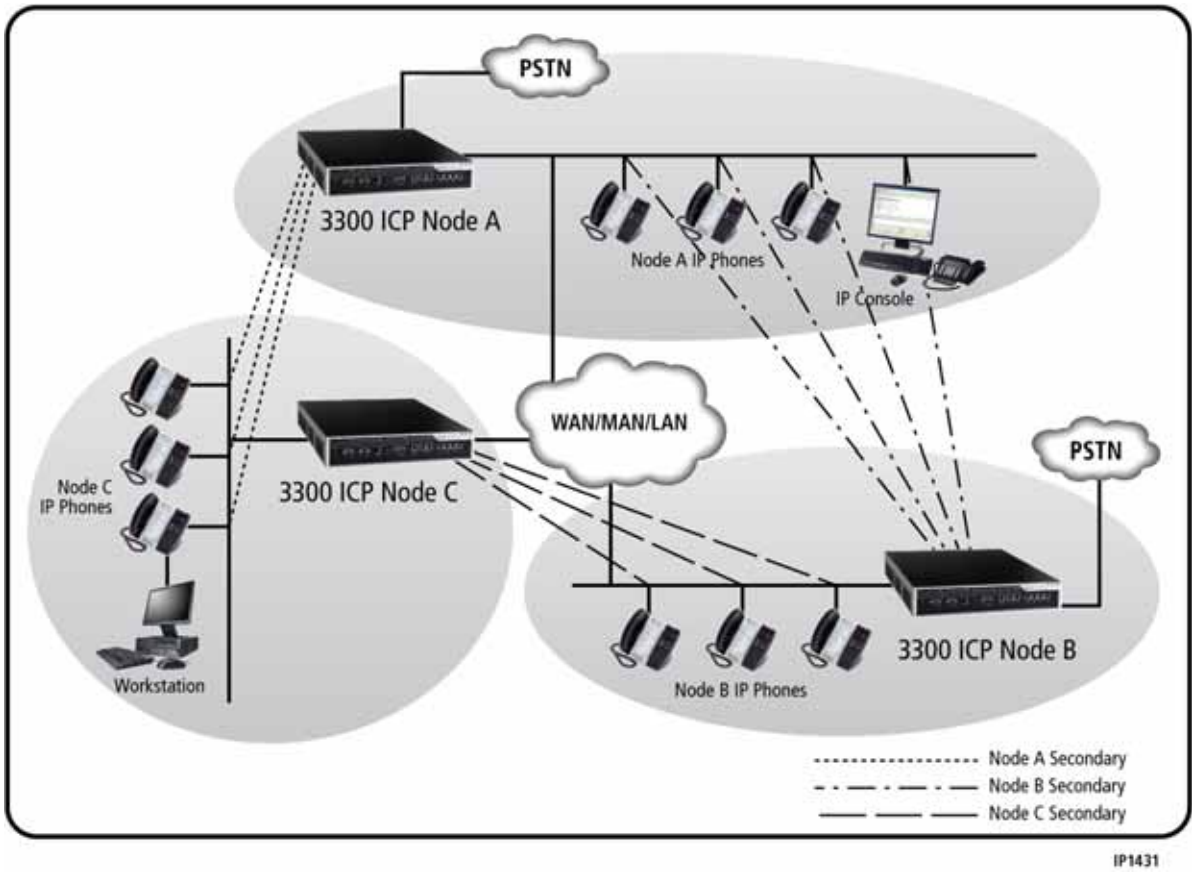
Figure 4: Distributed network - resilient



Enterprise network

An Enterprise network is assumed to include networks in multiple locations around the world, many with hundreds or thousands of users. Enterprise networks are configured with resiliency, and SDS changes are propagated over the LAN, locally, and the MAN or WAN, for information transfer to other sites.

Figure 5: Enterprise network - resilient



Networked Voice Mail

The MiVoice Business Networked Voice Mail feature (Networked Voice Mail) allows voice mail users to seamlessly send and receive messages between all the voice mail servers on a network. Networked Voice Mail supports both Embedded Voice Mail (networked and clustered) and NuPoint Unified Messaging, and allows:

- selecting destination mailboxes using the corporate voice mail directory.
- confirmation of destination mailboxes (name or number).
- using existing voice mail features such as receipts, distribution lists, replying to a voice mail

Limitations

Note the following limitations when using voice mail on SDS-enabled MiVoice Business networks:

- SDS does not share changes that are made to embedded voice mail user data through the telephone user interface.
- You must assign the same number to a user's extension and voice mailbox. SDS will be unable to distribute this data if you use different numbers.

If you use a different number for the voice mailbox, the voice mailbox number will not be entered in the Remote Directory Number table and will not be distributed by SDS.

- Data in the **VM Network Users** form is not propagated by SDS to other nodes in the network/cluster. Any changes must be manually entered in the **VM Network Users** form at other nodes where necessary.

For complete and detailed instructions for programming Networked Voice Mail, refer to the MiVoice Business System Administration Tool Online Help.

Setting up SDS sharing

Whether your network is new or existing, you must follow these general steps to start sharing data with System Data Synchronization:

Note: All nodes in the network must be running MCD Release 4.1+ or Release 4.0 migrated to RDN Synchronization Mode. For information about applying this migration, refer to the *Migrating to RDN Synchronization Mode Solutions Guide*.

1. Define the network

You use the **Network Elements** form to define which network elements will be in your network, and how they will share data. You can add MiVoice Business nodes and a MiCollab server, if applicable.

Note: Only one MiCollab server is allowed in an SDS sharing network, and all of the connected MiVoice Business nodes must be in the same Admin group if sharing with the MiCollab server. Refer to the MiCollab Server Manager Help.

The **Network Element** form allows you to add, delete, and change the elements in your network. All of the network elements in your network must be added to this list. This includes network elements that may be in other clusters that are part of this network.

When you are using SDS sharing, all of the network elements share basic data about the elements and the connections. Examples of forms that are always shared at the **All Network Elements** scope are **Network Elements** and **Admin Groups**.

For more information and detailed instructions, refer to the System Administration Tool Online Help.

2. Specify the forms to share, and the scope of the sharing (optional)

This is an optional step; you should generally leave sharing settings at their defaults. The scope at which a form can be shared depends on whether its data is local (specific to that MiVoice Business controller) or global in nature.

The data-sharing scope of the **3300 Network Element Properties**, **Network Elements**, **Cluster Definition**, and **Cluster Member** forms cannot be changed, because the default scope settings of these forms are required to support SDS.

SDS sharing for many of the other forms allows you to specify what data will be shared, down to the record level. You can also specify which network elements to share—or not share—data with.

While the default sharing scope for each form is usually exactly what you require, there may be situations that require changes to the defaults. For example; you might want to allow unrestricted access to long distance to one Admin Group, and restrict long distance for another Admin Group. In this case, you would share Class of Service and Class of Restriction at the Admin Group scope. For more information about sharing at the Admin Group scope, see "Using the Sharing scope in Admin Groups" on page 42.

Note: You must be a **root** user to change sharing scope.

The **SDS Form Sharing** form (formerly **Shared Forms Configuration**) allows you to:

- Select the scope of sharing for each form. For more information about SDS sharing scope, see "Sharing scope" on page 15.

  It is recommended that you leave the sharing scope at the defaults, at least when you first start SDS sharing.

- Prevent specific records in a form from being shared, by setting filter criteria. Leave these settings at their defaults for now.

There are some forms for which the sharing scope and record sharing is set, and cannot be changed. These are shown in the **SDS Form Sharing** form in grey italic font. For example, the **Cluster Elements** form is always shared at the **All 3300 ICP** sharing scope, and this cannot be changed.

Even in those forms that are not greyed-out, some forms have limits on what you can change. For example, you can change the sharing scope of the **Alarm Email Notification** form (the default is **All 3300 ICP**), but you cannot change which records are shared.

For most of the forms, you can change the sharing scope (**Share Form With** column) and the records in the form to share (**Share Records** column). Clicking **Change** displays the **SDS Form Sharing** dialog box. For each field, you can set filter conditions to set which records to share, based on their value.

For more information and detailed instructions, refer to the System Administration Tool Online Help.

3. Start Sharing

The **Start Sharing** button, available on the **Network Elements** form, initiates data sharing from the local element with the selected remote elements at the defined scope. This action synchronizes only forms always selected by default. (You will see these forms in the **Confirm Synchronization** dialog box—you cannot de-select them.)

Note: Start Sharing does not synchronize the databases of the selected elements. See "4. Synchronize your network elements" for more information.

Start Sharing adds each selected network element to the sharing community, so that when a record is added or modified in a shared form of any of the network elements, the update will be sent automatically to the databases of the other network elements.

Note: To access other nodes in the network, their IP addresses must be added to the intranet zone on the administration PC. For more information, refer to Mitel Knowledge Base article 09-5173-00058.

Note: You cannot join two existing SDS networks. Choose one SDS sharing community to be your starting SDS network. On each element in the other SDS sharing group, disable **System Data Synchronization** in the **System Options** form, and then re-enable it; then add the elements to your starting SDS network, using the instructions in “Adding elements for sharing” on page 33.

To start sharing:

1. Log in to the System Administration Tool on the network element that will be your Sync master. It is recommended that this be your fastest and least-loaded element.
2. Navigate to the **Network Elements** form.
3. Select the network elements that will be in your sharing community.
4. Click **Start Sharing**.

Note: To ensure that the Microsoft Internet Explorer browser session does not time out before the **Start Sharing** operation is complete, install the additional Internet Explorer registry file, as described in Mitel Knowledge Base article 07-3829-00006 on Mitel Online.

If **Start Sharing** fails with a Connection error, check the **System Options Form** on the failing network elements, and ensure that **System Data Synchronization** is set to **Yes**.

For details and conditions, refer to the System Administration Tool Online Help.

4. Synchronize your network elements

After you add the network elements to the sharing community using the **Start Sharing** button, you must synchronize the network elements with each other. The one exception to this rule is if both network elements are new, and no database changes have been made.

The **Sync** button on the **Network Elements** form allows you to synchronize the shared data on the local element with one or more remote elements selected on the form.

It is recommended that you provision data sharing from just one master element in the network or cluster. When you provision data sharing from one master element, you can monitor errors from that one master element. If you configure data sharing from multiple elements, then you must log in separately to each element to check for errors.

You can attempt to synchronize all of the network elements at the same time, but a prioritized approach generally saves time. It is recommended that you perform the Sync operation on one element at a time, particularly if there are elements that are significantly out of sync. Then you

repeat the Sync procedure, adding forms to synchronize, and then progressing to other network elements.

To synchronize the network elements:

1. On your Sync master, navigate to the **Network Elements** form.
2. Select one or more network elements in your sharing community. If there is one element in particular that you know is out-of-date, select just that element.
3. Click **Sync**.

   The **Confirm Synchronization** dialog box appears.

Note: If you have not already done so, to ensure that the Microsoft Internet Explorer browser session does not time out before the **Sync** operation is complete, install the additional Internet Explorer registry file, as described in Mitel Knowledge Base article 07-3829-00006 on Mitel Online.

4. Leave **Merge** selected. The synchronization operation will combine data from the Master and Slave, where applicable.
5. In the **Shared Forms To Be Synchronized** list, select the forms to synchronize.

   Consider performing the Sync procedure multiple times, fixing any errors that appear, and then synchronizing again with more or different forms selected. The following order is recommended:

   - On the first pass, select only the **Service Hosting** form. Fix any errors that appear. See “5. Resolve SDS Sync failures” on page 27.
   - On the second Sync, select only the **User** form. If resiliency (device or groups) are configured between the Sync master and slave systems, you can also select **Device Level Resiliency** or **System Level Call Handling** on the second Sync.
   - On the third Sync, select only the **Telephone Directory** form (under **User**).

Note: In MCD Release 6.0 and MiVoice Business Release 7.0, the **User** group of forms is automatically selected when you select **Telephone Directory** for Sync. If the user definition forms have already been successfully synchronized, then you can de-select the user definition section before doing the **Telephone Directory** form.

   - When these forms synchronize successfully, continue to synchronize the rest of the network elements and forms to be synchronized.

6. Click **OK**.

Note: If you do not select any forms when you start a **Sync** operation, the synchronization that takes place is exactly the same as what happens when you click **Start Sharing**. To synchronize database information like user records, device records, and the telephone directory, you must select these forms during the **Sync** operation.

Note: In some cases, devices may not be recognized by the slave node as RDN entries, so you may have to perform the Sync twice to remove errors associated with **Trunk Attributes**, **Call Rerouting**, and **Visual Voice mail** forms. In this case, the first Sync initiates the RDN entries and they exist as a reference when the second Sync occurs. Then the second Sync finishes with no errors.

Clicking **Sync** triggers the following:

1. All System Administration Tool, Group Administration Tool, Desktop Tool, and MiXML sessions are blocked from accessing the elements. Hospitality database operations are also blocked.

Note: it is recommended that the Sync operation be performed when the volume of check-ins and check-outs in the Property Management System (PMS) is low. Check-ins and check-outs may fail with errors.

Note: In a contact center, MiContact Center database synchronization will not be available.

2. Although multiple network elements are selected to **Sync**, the point-to-point **Sync** processes the network elements one by one. The Merge Sync first collects the data from the slave node, then add the records that exist only on the slave side to the Sync Master (local node), to create a superset of the data.
3. For the records that exist on both master and slave but with fields containing different data, the data on the master takes precedence; no changes are made on the master. The master then collects its local data (superset data) and sends it to the slave. The slave overwrites its local data with the superset data received from the master. For more information about data merge and data overwrite, see “Overwrite vs. Merge in the Sync operation” on page 41.
4. Distribution errors and updates to the remote nodes are removed from the local node because they are no longer needed (this applies only to forms that have been selected for synchronization).
5. Any data updates sent from the other elements to an element currently involved in a synchronization will be rejected by that element and recorded as an error on the change master. These updates will be re-tried automatically.

If the **Sync** operation finishes without errors, skip to “6. Perform backups of your network elements” on page 29.

If the **Sync** operation results in synchronization errors, continue with “5. Resolve SDS Sync failures”.

5. Resolve SDS Sync failures

If your synchronization does not succeed, or if it finishes with errors, resolve the Sync failures to ensure that your network elements are synchronized with each other.

Start by checking the **Maintenance Logs - All** form on the Sync master so that you can see which forms have failed. Then check the Maintenance Logs forms on the Sync slaves. Information in the logs explains the Sync errors.

For more information, refer to the **Troubleshooting** help topic in the System Administration Tool Online Help.

Adding a MiCollab server to the sharing network

After there are no outstanding SDS distribution errors, configure Flow Through Provisioning.

1. Review the Conditions and Limitations. If MiCollab will manage a group of MiVoice Business systems, they must be configured in a single administration group within an SDS sharing network. All the MiVoice Business servers in the sharing network must be at MiVoice Business Release 7.1 SP1 or later.
2. Check that there are no outstanding SDS distribution errors on the MiVoice Business network. Refer to the MiVoice Business System Administration Tool help for instructions on how to resolve SDS distribution errors.
3. Create backups of the MiCollab database and all MiVoice Business databases.
4. Add the MiCollab server as a network element (server type **MSL Server**) to the **Network Elemen**t form of one of the MiVoice platforms in the existing sharing cluster.
   a. Log into the MiVoice Business System Administration Tool.
   b. In the top left corner, select **View Alphabetically**.
   c. In the left forms menu, click **Network Elements**.
   d. Click **Add** and add the MiCollab server with type **MSL Server**.

   By default, the MiCollab server is added to the **Network Element** tab of **Users and Services** application.
5. Start sharing with the MiCollab server.
   a. Check the box of the MiCollab server (MSL Server type)
   b. Click **Start Sharing**.
   c. Verify that the correct elements are listed.
   d. Click **OK**. After the start sharing operation is complete, the Data Sharing field for the MiCollab server (MSL Server) will change to YES. This operation also synchronizes the entries in the MiCollab network element tab with the MiVoice Business Network Element form.

Note: Templates will be associated with the network element from which you started sharing.

6. In the **Network Element** tab of the **User and Services** application, edit the newly added network elements and enter the desired **Set Registration Codes** and **Set Replacement Codes**.

7. Log in to the MiCollab server manager. There will be a red warning banner present if you are required to run the **Reconcile Wizard**. This wizard compares the data entries in the MiVoice Business databases with the data entries in the MiCollab database and merges matching entries into a single entry with multiple phones.

Note: If you need to run the Reconcile Wizard, do not make any user updates from the MiCollab USP until after you have run the wizard and the databases are in sync. While the databases are out of sync, MiCollab USP updates are not shared to the network elements.

Refer to the MiCollab Server Manager Help for instructions.

8. If required, run the **Reconcile Wizard**.
9. Check the **Distribution Error** application and resolve any distribution errors.
10. Create backups of the MiCollab database and all MiVoice Business databases.

6. Perform backups of your network elements

After performing the **Sync** and resolving all of the SDS synchronization errors, you know that the network elements are synchronized with each other. This is a good time to back up all of the network elements.

For each network element, log in to the network element, and perform the backup, following the instructions in the MiVoice Business System Administration Tool Online Help.

If you are running pre-Release 4.2 MCDs, remember to use the **DBMS SAVE** maintenance command when installing and licensing are complete. This stores the database so that, on reset, it recovers to the last stored state—the current updated version.

SDS and resilient devices

You can add resilient IP phones and IP consoles by assigning a secondary controller to take over if their primary controller fails.

Note: The primary and secondary MCD or MiVoice Business elements should be at the same software release level to ensure that users have access to the same features on secondary controllers when they fail over.

After you set up data sharing between the primary and secondary controllers, the application automatically keeps user and device data, such as feature key programming and do-not-disturb (DND) settings synchronized between the primary and secondary controller when changes are made on either the primary or the secondary controller:

- If resilient users modify their set programming while their sets are being supported on the primary controller, SDS automatically updates the secondary controller with the changes.
- If resilient users fail over to their secondary and modify their set programming, SDS updates the primary controller with the changes after the primary controller returns to service.
- If an administrator updates resilient user and device data on either the primary or secondary controller, SDS automatically updates the database of the other controller.

Note: The primary and secondary controllers must be in the same cluster. You define a cluster using the **Cluster Elements** form.

CAUTION: With MiCollab in the SDS sharing network:

If resiliency is configured for a MiVoice Business solution, data updates are sent from MiCollab to the primary controller. If the primary controller is out of service, the MiCollab USP application does not provide data updates to the secondary controller. Instead, an error message is presented in MiCollab indicating that the primary controller cannot be reached.

Enabling device resiliency

To enable device resiliency, a device must have a secondary controller assigned:

- To enable resiliency for an IP phone, open the **User and Services Configuration** form, select the user, and click **Change**. In the **User and Services Configuration** dialog box, select the name of the secondary controller from the **Secondary Element** drop-down menu, and click **Save**.
- To enable resiliency for an IP console, open the **IP Consoles** form, select the device, and click **Change**. In the **IP Consoles** dialog box, select the name of the secondary controller from the **Secondary Element** drop-down menu, and click **Save**.

Check the **SDS Distribution Errors** form regularly during these operations, and resolve any errors that appear.

Synchronizing resilient devices

For full resilient operation, you must keep the primary and secondary controllers synchronized.

1. Log in to the primary controller, and navigate to the **Network Elements** form.
2. Select the secondary controller.
3. Click **Sync**.
4. In the **Confirm Synchronization** dialog box, select the device forms.
5. Click **OK**.

Maintenance

When you start SDS sharing, you set up and configure your network, set up your clusters and Admin groups, **Start Sharing**, and then click **Sync**. After all this is done, your network elements are synchronized, and every update is automatically propagated to the other network elements, based on the sharing scopes you configured.

At first glance, you might be tempted to think you never need to touch the sharing settings, and you never need to click **Sync** again.

In the real world, however, there are network changes, additions, and equipment failures that require you to keep an eye on the SDS data sharing. For example:

- A network link goes down.
- A shared network element fails.
- A new network element is added, or a network element is removed.
- An erroneous change is made on one of the network elements.
- A backup is restored, and the recent changes need to be shared to bring the restored element up to date.

  The older the backup, the more out-of-sync it is with respect to the other network elements, so it is recommended that you take frequent backups.
- A software upgrade of some (but not all) MiVoice Business elements to a new version may result in a mismatch of the fields to be synchronized.

All of these events result in SDS distribution errors that you must repair to bring the network elements back into synchronization. You should examine each SDS distribution error carefully, and repair each one as described in “Resolving SDS Distribution Errors” on page 36.

SDS Distribution Errors trigger alarms on the System Administration Tool. Alarms appear in the banner at the top of the System Administration Tool user interface, and at login. When you see an alarm message, it means:

- One or more system data errors has occurred.

  System failures include errors in the core data forms, such as the **Network Elements** form.
- 100 or more user data errors have occurred.

  These are errors that occur when propagating user and device data through the network.

It is strongly recommended that you resolve them as they appear.

Ensuring that all SDS distribution errors are resolved regularly will help keep your network working smoothly.

Preventing synchronization problems

The top four actions you can take to prevent synchronization problems are:

- After the **Start Sharing** action finishes successfully, remember to click perform a full **Sync**.

  You use **Start Sharing** when first setting up your clusters and Admin groups, but you also use **Start Sharing** whenever you add a new network element to your sharing group. Remember to click **Sync** after the **Start Sharing** action is complete.

- Investigate and resolve all SDS distribution errors.

  If you resolve SDS distribution errors regularly, you can prevent small problems from snow-balling into large problems.

- Keep up-to-date backups for every network element.

  When you need to restore a database, the number of differences you have to resolve between the system state and the backup you are restoring is low.

Tip: After restoring, remember to Sync the restored node. Log into an up-to-date node, and, in the **Network Elements** form, select the restored network element, and click **Sync**.

- Monitor the alarms that appear, and resolve them regularly.

Adding elements for sharing

After you have set up a data-sharing network or cluster, you can add new elements to the network and start sharing with the new element.

Note: You cannot join two existing SDS networks. Choose one SDS sharing community to be your starting SDS network. On each element in the other SDS sharing group, disable **System Data Synchronization** in the **System Options** form, and then re-enable it; then add the elements to your starting SDS network, using the following procedure.

To add network elements for sharing:

1. Ensure that the new network element is running at least MCD v4.0.
2. Add the element to your network by adding it in the **Network Elements** form.
3. Optional: Add the network element to a cluster by adding it in the **Cluster Elements** form.
4. Optional: Move the element to a custom Administrative Group by changing it in the **Admin Groups** form. (By default, all elements are in the **System Defaulted** Admin Group.)

Note: It is strongly recommended that each Admin Group contain no more than 20 network elements. To avoid performance impact, some functionality is automatically disabled if one or more Admin Groups are too large.

5. Ensure that the new element is not currently a member of any other data-sharing network. If it is still a member of another data sharing network, remove it using the instructions in “Removing network elements from sharing”.

6. Log in to a network element that is already in the data sharing community.
   a. Start sharing with the new network element. See “3. Start Sharing” on page 24.
   b. Synchronize with the newly-added network element. See “4. Synchronize your network elements” on page 25.
7. Optional: Add a MiCollab server in the **Network Elements** form. For details, see “Adding a MiCollab server to the sharing network” on page 28. Refer to the MiCollab Server Manager Help Flow Through Provisioning topics for conditions and limitations.

Removing network elements from sharing

You can remove network elements from your data sharing community at any time. A couple of reasons why you would remove an element from sharing:

- You need to make repairs on the element, and removing it from sharing prevents Connection errors from appearing on the other elements while you are working on the problem element. After the repair, you can add the element back into the sharing community.
- You need to remove the element completely, so you stop sharing first.

Note: To remove the element from the network completely, refer to the *Voice Clustering Design and Implementation Guide* or the System Administration Tool Online Help.

If you want to keep the node in the network, but you want to disable sharing, use one of the following procedures.

If the network element is accessible:

1. Log on to the network element.
2. Navigate to the **System Options** form.
3. Disable **System Data Synchronization**.

Note: You can add the network element back in at any time by re-enabling the **System Data Synchronization** option, and starting sharing again. Then a new Sync from an up-to-date master will synchronize the network element with the existing network elements again.

If the network element is not accessible:

Use the REMOVESHARINGNE maintenance command to remove a network element from sharing in the case where you cannot disable SDS because the network element is not accessible. This will allow you to prevent an accumulation of SDS Connection errors on the network elements it is sharing with.

Note: The **REMOVESHARINGNE** maintenance command is available in MCD Release 6.x and MiVoice Business 7.0+.

1. If the name of the network element to be removed from sharing includes a space, rename the network element to remove the space before proceeding. If the network element has a blank name, name the element before continuing.

2. Log in to a network element that is NOT being removed from sharing.
3. In the **Maintenance Commands** form, type:

   REMOVESHARINGNE NodeName

4. Check the SDS Distribution Errors form to ensure that all nodes received the instruction to remove the node from sharing.

Managing network elements using Application Reach-Through

The Reach-Through feature allows you to manage all the nodes in the same Admin Group from one node. On any form, you can “reach through” to view and change the same form on another node in the Admin Group.

Conditions for use of Reach-Through to view and edit forms on other MiVoice Business controllers:

- The controllers must be in the same Administrative Group, and they must be sharing data.
- The **User Authorization** forms must be shared.
- The date and time settings must be matched. Use the **Date and Time** form on each controller to set the date and time to the same time zone.
- The IP addresses of the controllers you want to view or change using Reach-Through must all be added in the local intranet sites list in your browser.

Note: If controllers are on different platforms; for example, 3300 ICP CX compared to MiVoice Business on ISS, certain forms may not be visible. For example, the MiVoice Business on ISS has no PSTN trunk connectivity. These forms are not displayed using Reach-Through to the CX from the MiVoice Business on ISS.

You can also use Reach-Through from the MiCollab server, if there is one in the sharing network. Observe the following conditions:

- Reach Through is supported only using Internet Explorer (version 7.0 or later) or Mozilla Firefox (version 17 or later) browsers and you must have installed the browser with the Mitel Root Certificate. If you attempt to use any other type of browser to reach through from MiCollab to MiVoice Business, reach through will be blocked. Note that Internet Explorer is not supported in Compatibility Mode.
- Reach through from MiCollab USP to the MiVoice Business System Administration Tool and from the MiVoice Business System Administration Tool to MiCollab USP is in the context of the administrator account for audit purposes.
- You must enable the SNMP Agents on every element in the SDS Admin Group.

Troubleshooting

For general troubleshooting, refer to the System Administration Tool Online Help, and the *Mitel 3300 IP Communications Platform Troubleshooting Guide*.

The three most common problems that cause trouble for network administrators are:

- Restoring a foreign database

  Pre-MCD-Release 5.0: Restoring a database from another controller in the network results in having duplicate controllers in the network, and this is not supported by SDS.

  Restoring a database from another controller, even from outside the network, often causes problems because of the hardware-specific records like trunk and DN programming. This results in references to network elements not in the current network, so SDS does not recognize the data.

- Forgetting to run a full **Sync** after **Start Sharing**

  Clicking **Start Sharing** adds the network elements to the data sharing community and shares some of the basic networking forms, and it enables data sharing, but it does not synchronize all of the data.

  If you click **Start Sharing**, but you do not follow that by performing a **Sync** operation, your network elements will recognize each other, and changes on any of the network elements are propagated to other network elements in the network, but any data that has not been changed is not synchronized. You must click **Sync** to synchronize the data on all the network elements.

Note: When you click **Sync**, remember to select which forms to synchronize. If you do not select any forms, you will see a successful sync message, but only core data was shared.

See “Setting up SDS sharing” on page 23 for more information.

- Not resolving **SDS Distribution Errors**

  SDS distribution errors, if not resolved, can prevent data sharing for parts of your database, and over time, network elements can become significantly out of synchronization.

  For information about resolving the different types of SDS distribution errors, see “Resolving SDS Distribution Errors” on page 36.

Resolving SDS Distribution Errors

Pending updates and data distribution errors are collected and displayed in the **SDS Distribution Errors** form of the local element where you initiated the **Start Sharing** operation. You must resolve data distribution errors at the element where the updates were initiated.

CAUTION: Do not delete an error record before investigating the source of the error. Deleting the error may cause subsequent retry operations to fail if the errors are caused by a connection problem.

To resolve distribution errors from the originating element

1. In the System Administration Tool, access the **SDS Distribution Errors** form. The number of data sharing errors is given at the top of the form.
2. To view all records, in the **Display** field:
   - Select **all,** and click **Retrieve**.
   - Or, to view a subset of records, select **first** or **last**, select the desired number of records, and click **Retrieve**. The main frame of the window displays a list of the pending and failed updates.

Note: Try to keep the number of SDS errors to work on to a minimum. The best way to do this is to resolve the errors frequently, so they do not accumulate.

3. Click the **Action ID** field heading to sort the errors by action ID. You can sort the errors based on any of the column headings by clicking on the desired heading (for example, **Reason**).
4. Select the record using the check box, and apply **Retry** or **Force Change**. To see the details of a record, highlight the record.

Note: You can check the boxes of multiple records, and the operation that you choose will be applied to all of the checked records. To select all SDS distribution errors, click **Select All**.
When you select multiple records, the **Retry** and **Force Change** operations will be available only if the records selected are of the same type.

5. There are three ways to resolve SDS distribution errors:
   - In the case of an application error, log in to the slave element and fix the error manually. If the change master and the remote network element are in the same administrative group, you can use the Reach-Through feature to view and update form data on the remote network element.
   - If the error was caused by a connection error that has since been fixed, click **Retry**. The update should be sent successfully. (The **Retry** option is available only for connection errors.)
   - If there are conflict errors caused by a mismatch of the original data values (concurrent change rejection), and you understand why the original values are different, click **Force Change**. Forcing the change overrides the conflict and writes the update. (The **Force Change** option is available only for conflict errors.)
6. After resolving all of the SDS distribution errors, click **Data Refresh** to update the **SDS Distribution Errors** form. The SDS distribution errors you have resolved will disappear from the form.

Note: The system automatically retries updates that have failed because of connection problems. After updates are completed successfully, they will disappear from the **SDS Distribution Errors** form (you may have to click **Data Refresh**).

7. After you have corrected an error, you may have to delete the error record, if it is not cleared automatically. Go back to the **SDS Distribution Errors** form on the local element, select the error record and click **Delete**. The update error is removed from the main window and

the error log is removed from the logs. You can also choose to delete an error record if you understand the error and determine that the update is not required.

CAUTION: Deleting an unresolved error record may cause data inconsistencies that could cause subsequent retry operations to fail because of a dependency between the records.

Appendix A

ADVANCED SCENARIOS

Advanced Scenarios

In this section, you will find information that you probably will not need for day to day operation, but that you might be interested in knowing when you are setting up something special, or you need to do advanced debugging.

Overwrite vs. Merge in the Sync operation

In the Sync operation, there are two ways the data is reconciled, depending on the type of data and how the SDS sharing is programmed for the form: overwrite and merge. (When propagating changes automatically, the changes are always made by overwriting the data in the slave controllers.)

Overwrite

For the types of data designated as overwrite data, the master data is written onto each slave element so that they match. Any data that was on the slave previously is overwritten.

All the information is transferred from master to slave.

Note: Any errors that might occur appear on the slave, since all of the data transfer is in the direction of master to slave.

Merge

For the types of data designated as merge data, the master adds its data to the slave data, creating a data superset. The master then overwrites the slave data with the superset of the data. As with overwrite mode, master and slave end up with exactly the same data set, but in the merge case, the final data set is the superset of master data plus slave data.

Merge is the sharing method used for user lists. If, for example, the master network element (the element you initiate the Sync operation from) has records for John, Mary, and Paul, and the slave element has user records for John, Paul, and Susan, when the Sync is complete, both master and slave will contain information about John, Mary, Susan, and Paul.

Data that is updated is merged from the master. In the case where John's data is not the same on the master and the slave, the data from the synchronization master takes precedence. See “Synchronization master vs. change master” on page 14 for more information.

Note: Since data is being written in both directions—master to slave, and slave to master—you may see errors on both master and slave.

SDS Distribution errors and maintenance logs

In general, errors and warnings appear as follows:

- Sync operation: Errors appear in the **Maintenance Logs** forms. This is where you find information about errors that occurred during a Sync.
- Automatic change propagation: errors appear in the **SDS Distribution Errors** form.

Errors during a Sync operation

When you do a full synchronization (using the **Sync** button), if there are errors or warnings, you will see them in the **Maintenance Logs** forms on the various network elements involved in the synchronization. In addition to viewing the errors on the change master element, you should also check the Maintenance Logs on the slave elements. Depending on the type of error, one or the other may contain more information, which will help you resolve the error.

One exception to the rule

There is one exception to this rule. If, for example, Sync master A is synchronizing with slave B, then changes may also be shared with slave C (depending on the sharing scope of the forms being synchronized, and the relationship between the network elements). Any errors that occur between elements A and B will appear in the **Maintenance Logs** forms as expected. If, however, errors occur when the **Sync** operation results in sharing with element C, any errors resulting from merge operations will appear in the **SDS Distribution Errors** form.

Errors during an automatic change propagation

When errors occur during automatic change propagation, any errors that occur will appear in the **SDS Distribution Errors** form. You should make it a practice to check this form regularly and address any update errors that appear.

Alarms in the banner and at login alert you to the errors that have occurred. Check and resolve these frequently.

Using the Sharing scope in Admin Groups

By default, every network has one Admin Group, called **System Defaulted**. In most cases that is sufficient, but Admin Groups provide two primary benefits:

- Group network elements so that you can use the Reach-Through feature to view and change other elements in the group. This is the default operation and the most common use of Admin Groups.
- Group network elements so that they can have their own group-specific settings. You can use this capability if you have groups of controllers that need to have different settings.

  Let's say, for example, that you want all the departments in your company to be in the same cluster, but the Sales group and the Product Support group need different Feature Access Codes. You set up one Admin Group for Sales, and another Admin Group for Product Support, and then configure the Feature Access Codes to share at the Admin Group sharing scope.

For more information about configuring multi-node networks, refer to the *Multi-node Networking Solutions Guide* on Mitel Online.